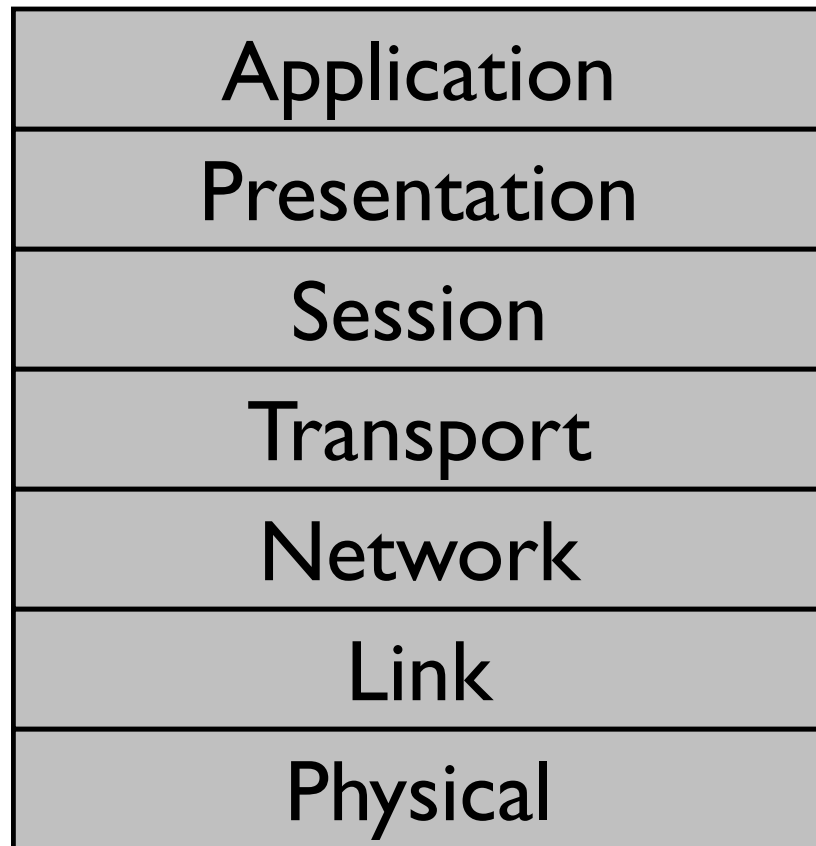


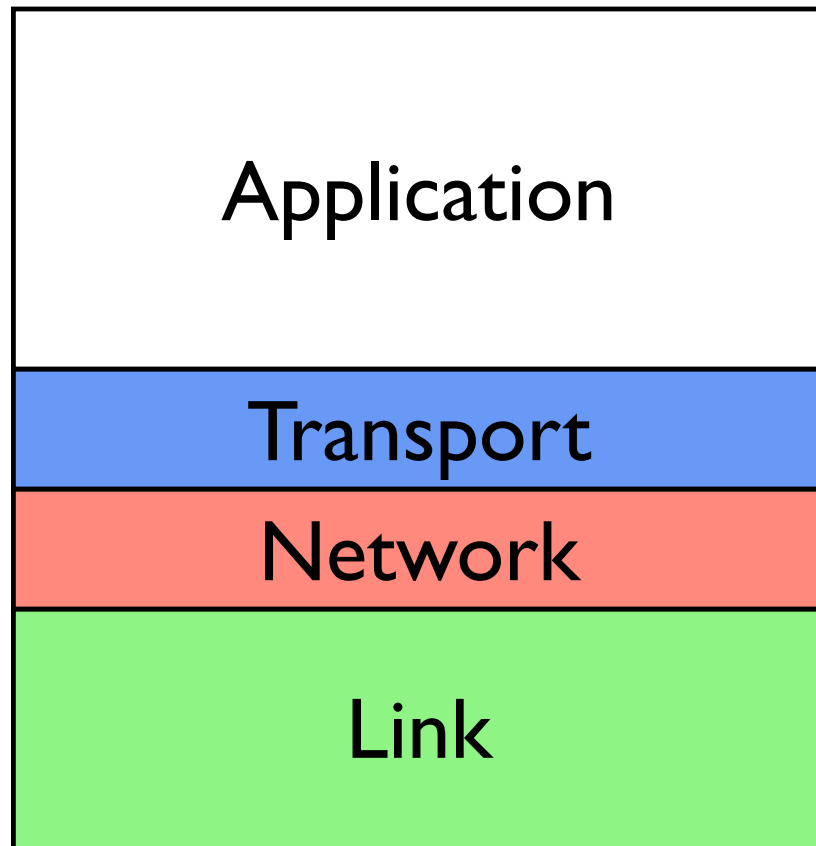
Principle: Encapsulation

Layering



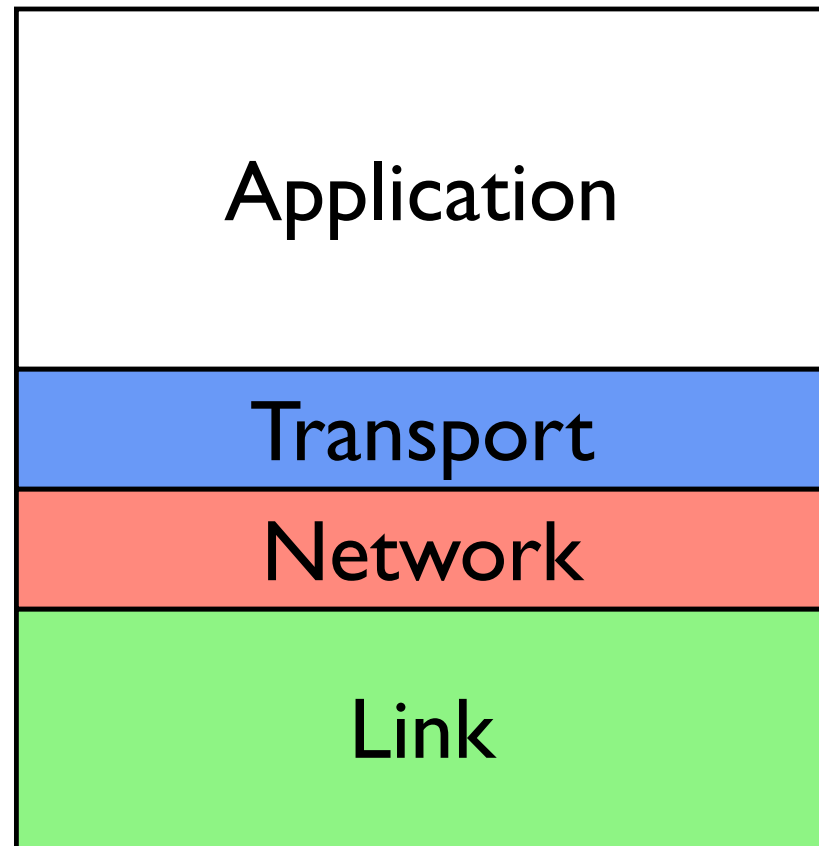
- Separation of concerns and responsibilities
- Allows each service to evolve independently
- Examples:
 - ▶ Transport: inter-application communication
 - ▶ Link: inter-host communication on a shared link

4 Layer Model



- Separation of concerns and responsibilities
- Allows each service to evolve independently
- Examples:
 - ▶ Transport: inter-application communication
 - ▶ Link: inter-host communication on a shared link

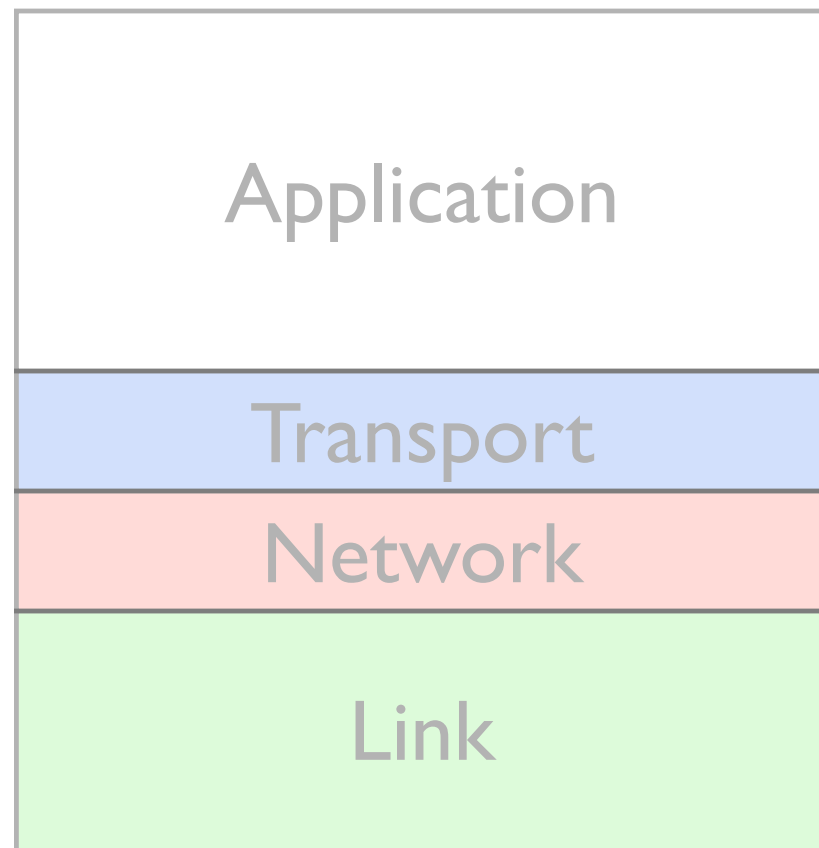
Encapsulation



- How layering manifests in data representation
- Layer N data is payload to layer N-1
- Example:
 - HTTP (web) application payload in
 - a TCP transport segment in
 - an IP network packet in
 - a WiFi link frame.



Encapsulation

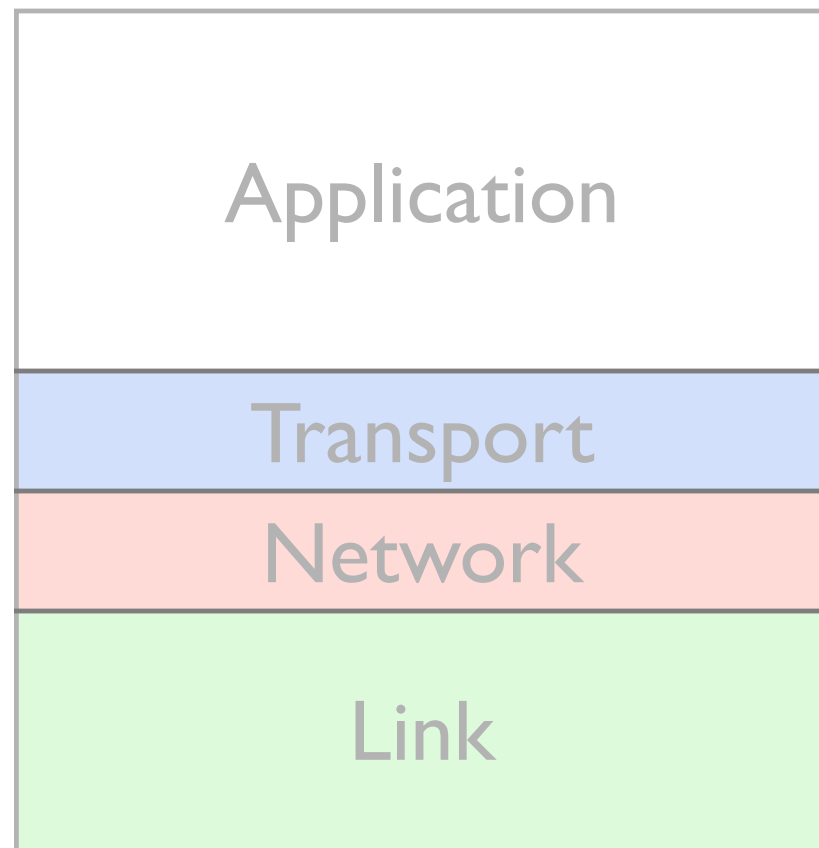


- How layering manifests in data representation
- Layer N data is payload to layer N-1
- Example:
 - HTTP (web) application payload in
 - a TCP transport segment in
 - an IP network packet in
 - a WiFi link frame.

Hardware: first bit on right



Encapsulation

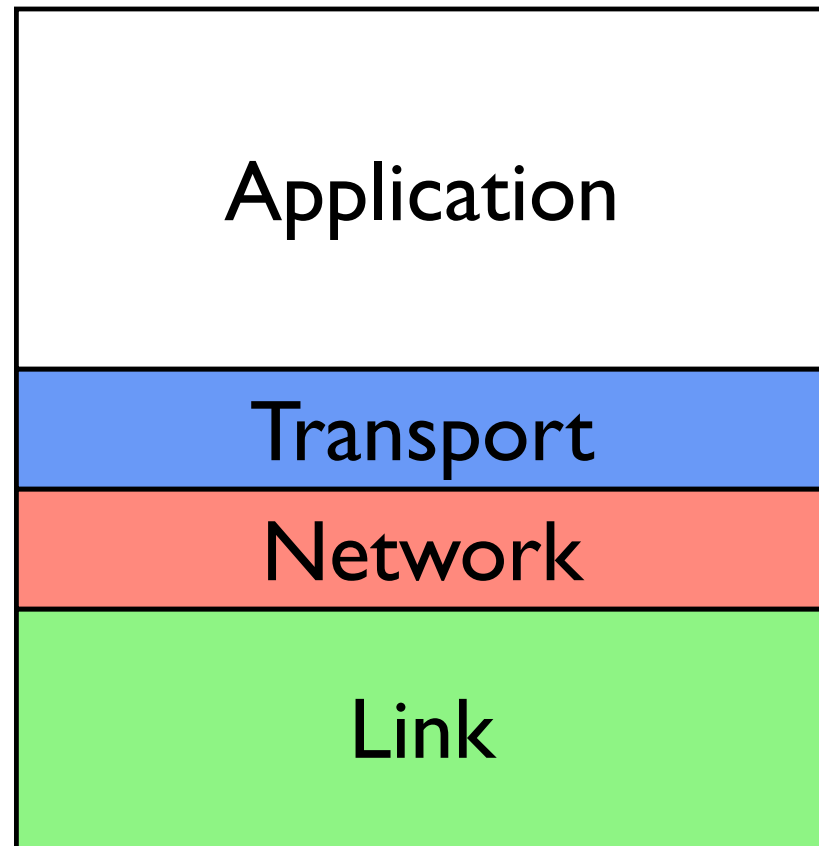


- How layering manifests in data representation
- Layer N data is payload to layer N-1
- Example:
 - HTTP (web) application payload in
 - a TCP transport segment in
 - an IP network packet in
 - a WiFi link frame.

Software: first bit on left



Encapsulation

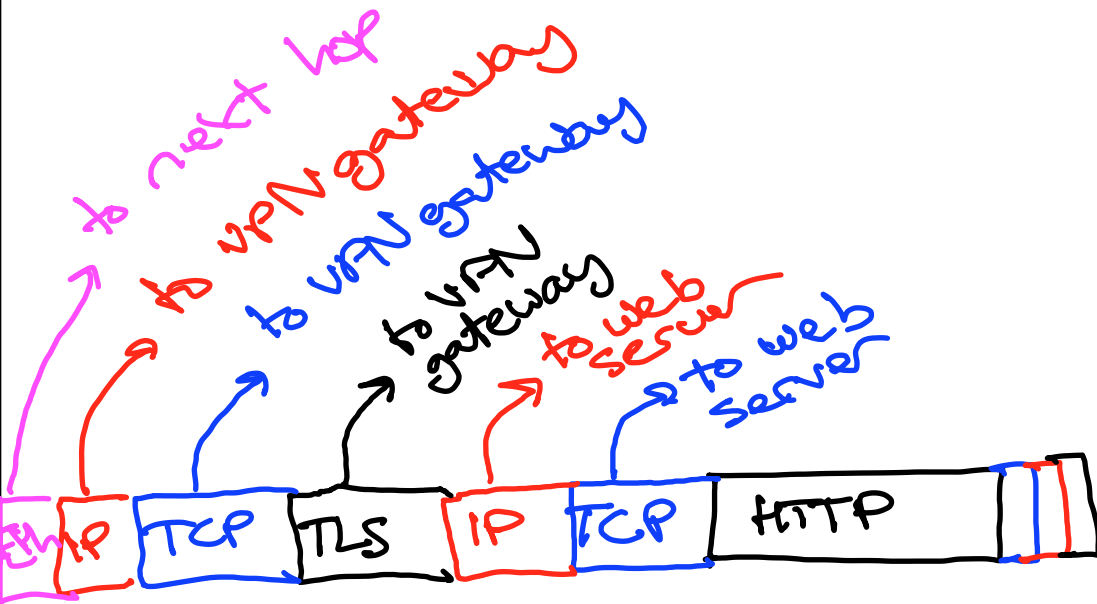


- How layering manifests in data representation
- Layer N data is payload to layer N-1
- Example:
 - HTTP (web) application payload in
 - a TCP transport segment in
 - an IP network packet in
 - a WiFi link frame.

Software: first bit on left

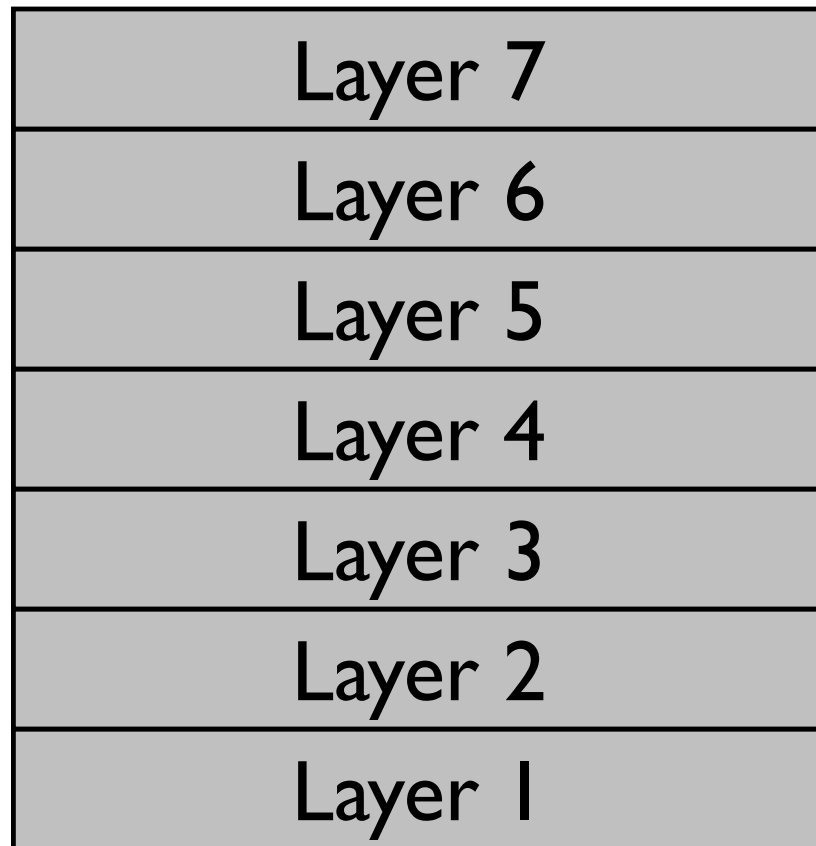


Encapsulation Flexibility



- Encapsulation allows you to layer recursively
- Example: Virtual Private Network (VPN):
 - HTTP (web) application payload in
 - a TCP transport segment in
 - an IP network packet in
 - a secured TLS presentation message in
 - a TCP transport segment in
 - an IP network packet in
 - an Ethernet link frame.

Encapsulation



- How layering manifests in data representation
- Encapsulated payloads
 - Help separation of concerns
 - Help enforce boundaries/layering
 - Simplify layer implementations